







Lab. Tech : K. Ford  
Date Completed : 1/20/14

Notes:

**Enginnering Materials Laboratory**  
4539 N. Brawley #108, Fresno, CA 93722  
559-276-9311



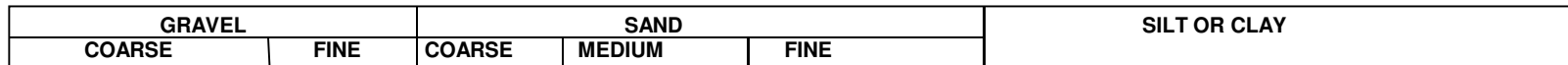
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
	Date: <u>9/23/2013</u>
TES#: <u>23502-ZS9</u>	Sample No.: <u>MC04-1</u>
Boring #: <u>S0020R; 11-11.5'</u>	Classification: <u>(SM) Silty Sand</u>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	219.2	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	219.2	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	192.1	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.1	0.0	0.0	100.0	
#8	0.2	0.1	0.1	99.9	
#16	0.2	0.0	0.1	99.9	
#30	4.6	4.4	2.1	97.9	
#50	70.1	65.5	32.0	68.0	
#100	159.7	89.6	72.9	27.1	
#200	188.1	28.4	85.8	14.2	
Pan	192.1				



[illegible]



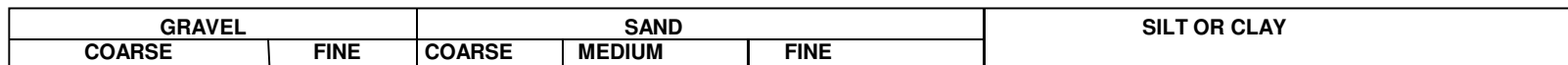
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: CA HSR	Technician: K. Ford
TES#: 23502-ZS9	Date: 9/23/2013
Boring #: S0020R; 16-16.5'	Sample No.: SS05
	Classification: <b>(SM) Fine Silty Sand</b>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	206.6	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	206.6	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	155.6	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	2.5	0.0	1.2	98.8	
#8	2.5	0.0	1.2	98.8	
#16	2.6	0.1	1.3	98.7	
#30	10.9	8.3	5.3	94.7	
#50	88.3	77.4	42.7	57.3	
#100	129.6	41.3	62.7	37.3	
#200	152.6	23.0	73.9	26.1	
Pan	155.6				



[illegible]





*Construction Testing & Inspection \* Geotechnical & Environmental Engineering*

## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project:	CA HSR	Technician:	K. Ford
		Date:	1/16/2014
TES#:	23502-ZS9	Sample No.:	SS07
Boring #:	S0020R; 25-26.5'	Classification:	(SM) Silty Sand

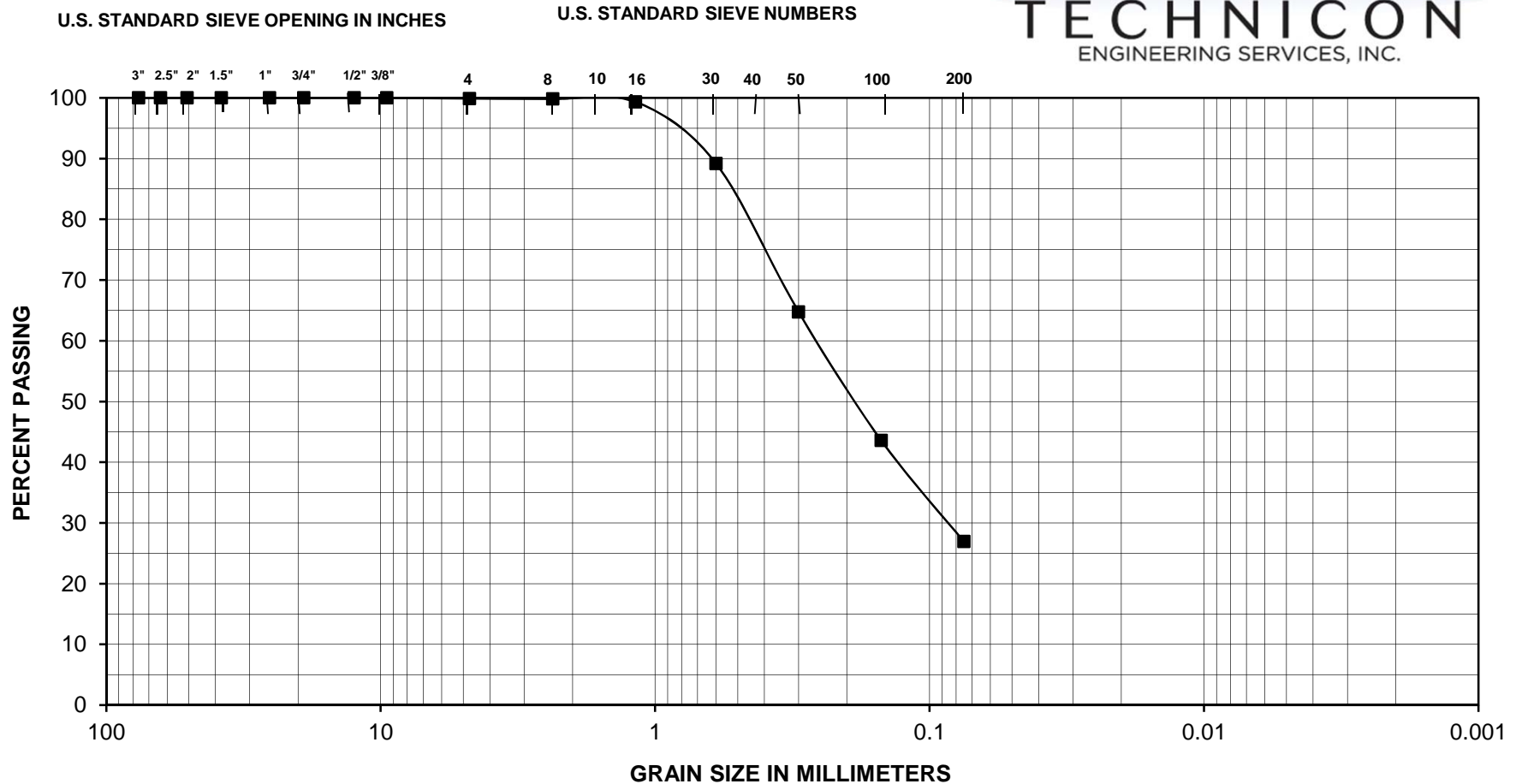
  

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	167.7	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Aggregate Before Wash	167.7	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Aggregate After Wash	127.8	2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.2	0.0	0.1	99.9	
#8	0.3	0.1	0.2	99.8	
#16	1.1	0.8	0.7	99.3	
#30	18.1	17.0	10.8	89.2	
#50	59.1	41.0	35.2	64.8	
#100	94.6	35.5	56.4	43.6	
#200	122.5	27.9	73.0	27.0	
Pan	127.8				



[illegible]





*Construction Testing & Inspection \* Geotechnical & Environmental Engineering*

## Sieve Analysis for Soil and Fine Aggregate

Project:	<b>HSR</b>	Technician:	<b>K. Ford</b>
TES#:	<b>23502-ZS9</b>	Date:	<b>9/12/2013</b>
Boring No.:	<b>S0020R</b>	Sample No.:	<b>SS09</b>
		Remarks:	<b>(ML) Clayey Silt</b>

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	54.9	1/2"	4.0 (2.0)
Initial Weight Fine Soil Before Wash	54.9	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Soil After Wash	<b>5.5</b>	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.0	0.0	0.0	100.0	
#16	0.0	0.0	0.0	100.0	
#30	0.3	0.5	0.5	99.5	
#40	0.1	0.2	0.7	99.3	
#50	0.4	0.7	1.5	98.5	
#100	0.8	1.5	2.9	97.1	
#200	3.5	6.4	9.3	90.7	
Pan					





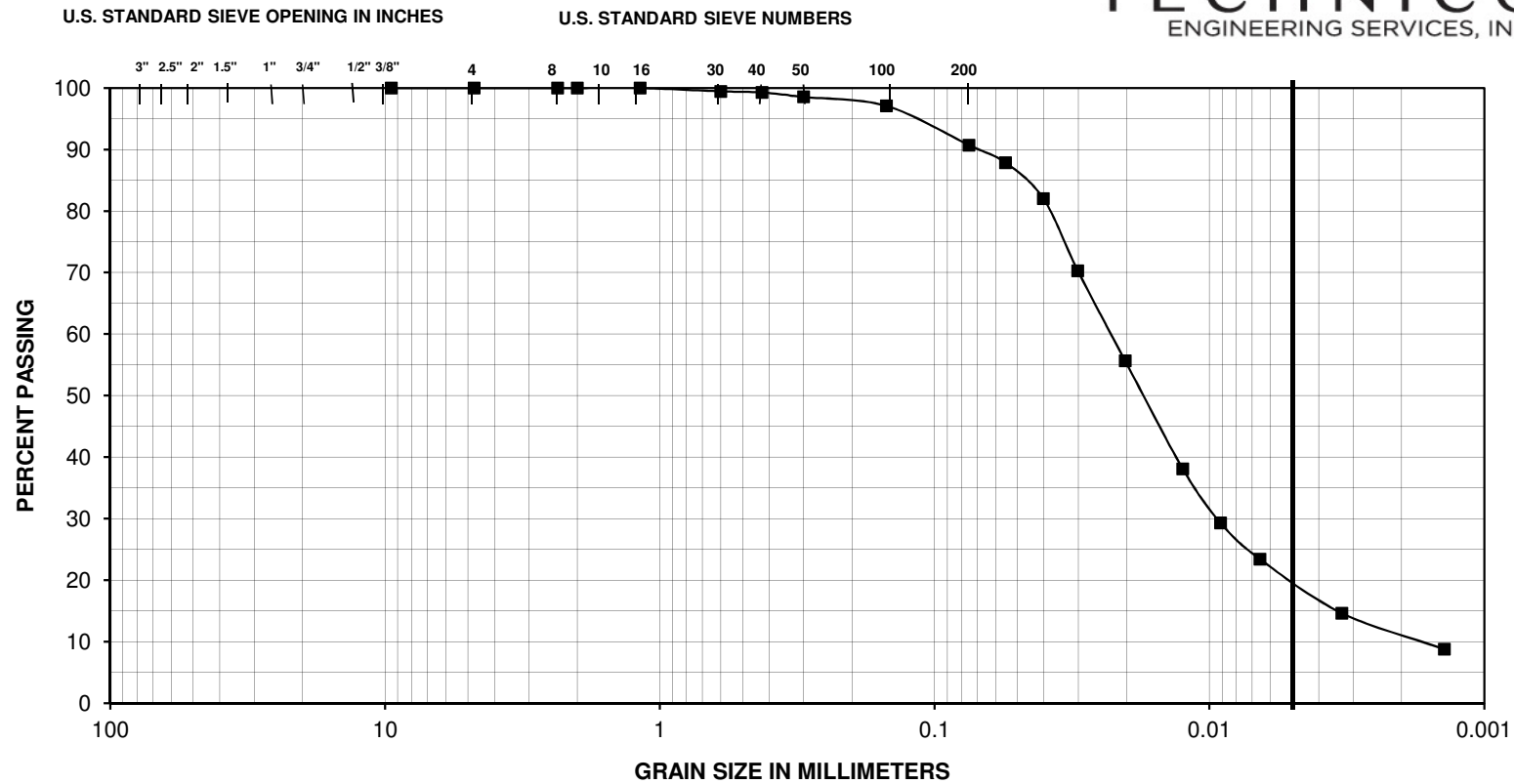
Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:		HSR		TES # : 23502-ZS9			
Boring Number		SS09		TESTED BY: K. Ford			
Sample Depth, ft		36-36.5'		DATE: 9/12/2013			
Mass of Test Sample, g		55.48	"air-dried"	Hydrometer Type 151H			
Mass of Hygroscopic Sample, g		29.76	"air-dried"				
Mass of Hygroscopic Sample, g		29.45	"oven-dried"	Specific Gravity of Test Material	2.650		
Mass of Test Sample, g		54.90	"oven-dried"	Specific Gravity of Test Solution	Varies		
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.032	1.030	21	8.4	0.01348	0.0553	87.9
1	1.030	1.028	21	8.9	0.01348	0.0402	82.0
2	1.026	1.024	21	10.0	0.01348	0.0301	70.3
5	1.021	1.019	21	11.3	0.01348	0.0203	55.6
15	1.015	1.013	21	12.9	0.01348	0.0125	38.1
30	1.012	1.010	21	13.7	0.01348	0.0091	29.3
60	1.010	1.008	21	14.2	0.01348	0.0066	23.4
250	1.007	1.005	21	15.0	0.01348	0.0033	14.6
1440	1.005	1.003	21	15.5	0.01348	0.0014	8.8
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.9





Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS09	(ML) Clayey Silt	0	9.3	70.9	19.8	1.1					
										TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter





*Construction Testing & Inspection \* Geotechnical & Environmental Engineering*

## Sieve Analysis for Soil and Fine Aggregate

Project:	<b>HSR</b>	Technician:	<b>K. Ford</b>
TES#:	<b>23502-ZS9</b>	Date:	<b>9/12/2013</b>
Boring No.:	<b>S0020R</b>	Sample No.:	<b>SS11</b>
		Remarks:	<b>(ML) Clayey Silt</b>

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	<b>61.6</b>	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	61.6	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	<b>7.0</b>	2"	44.0 (20.0)

Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	<b>0.0</b>	0.0	0.0	100.0	
2 1/2 in.	<b>0.0</b>	0.0	0.0	100.0	
2 in.	<b>0.0</b>	0.0	0.0	100.0	
1 1/2 in.	<b>0.0</b>	0.0	0.0	100.0	
1 in.	<b>0.0</b>	0.0	0.0	100.0	
3/4 in.	<b>0.0</b>	0.0	0.0	100.0	
1/2 in.	<b>0.0</b>	0.0	0.0	100.0	
3/8 in.	<b>0.0</b>	0.0	0.0	100.0	
#4	<b>0.0</b>	0.0	0.0	100.0	
#8	<b>0.0</b>	0.0	0.0	100.0	
#10	<b>0.0</b>	0.0	0.0	100.0	
#16	<b>0.2</b>	0.3	0.3	99.7	
#30	<b>0.2</b>	0.3	0.6	99.4	
#40	<b>0.2</b>	0.3	1.0	99.0	
#50	<b>0.1</b>	0.2	1.1	98.9	
#100	<b>1.7</b>	2.8	3.9	96.1	
#200	<b>4.2</b>	6.8	10.7	89.3	
Pan					





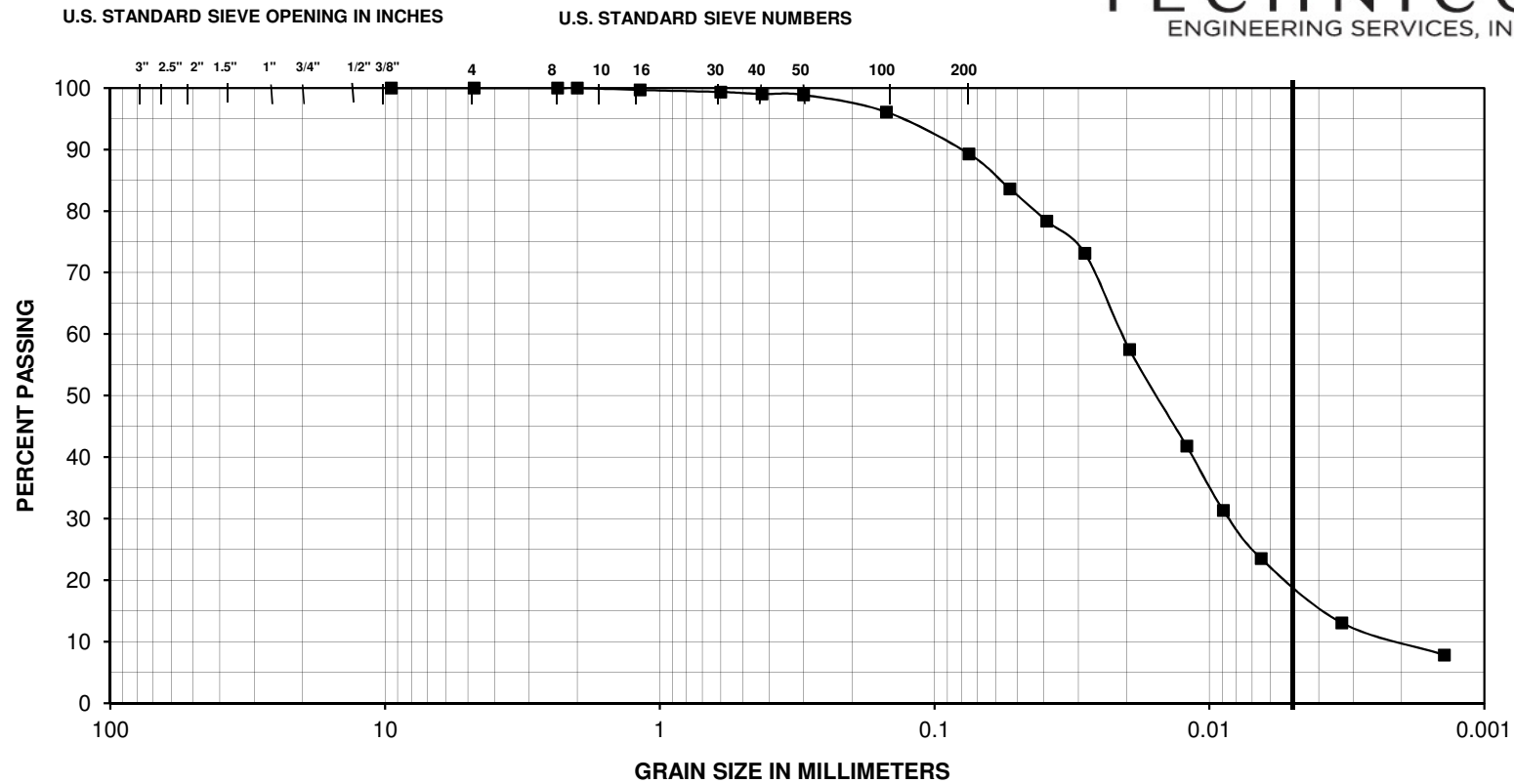
Construction Testing & Inspection \* Geotechnical & Environmental Engineering

## HYDROMETER TEST DATA SUMMARY

ASTM D 422-63

PROJECT:		HSR		TES # : 23502-ZS9			
Boring Number		SS11		TESTED BY: K. Ford			
Sample Depth, ft		41-41.5'		DATE: 9/12/2013			
Mass of Test Sample, g		62.26	"air-dried"	Hydrometer Type 151H			
Mass of Hygroscopic Sample, g		21.33	"air-dried"				
Mass of Hygroscopic Sample, g		21.09	"oven-dried"	Specific Gravity of Test Material	2.650		
Mass of Test Sample, g		61.56	"oven-dried"	Specific Gravity of Test Solution	Varies		
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.034	1.032	21	7.8	0.01348	0.0532	83.6
1	1.032	1.030	21	8.4	0.01348	0.0391	78.4
2	1.030	1.028	21	8.9	0.01348	0.0284	73.1
5	1.024	1.022	21	10.5	0.01348	0.0195	57.5
15	1.018	1.016	21	12.1	0.01348	0.0121	41.8
30	1.014	1.012	21	13.1	0.01348	0.0089	31.3
60	1.011	1.009	21	13.9	0.01348	0.0065	23.5
250	1.007	1.005	21	15.0	0.01348	0.0033	13.1
1440	1.005	1.003	21	15.5	0.01348	0.0014	7.8
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.2





Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS11	(ML) Clayey Silt	0	10.7	70.4	18.9	1.14					
										TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter



## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

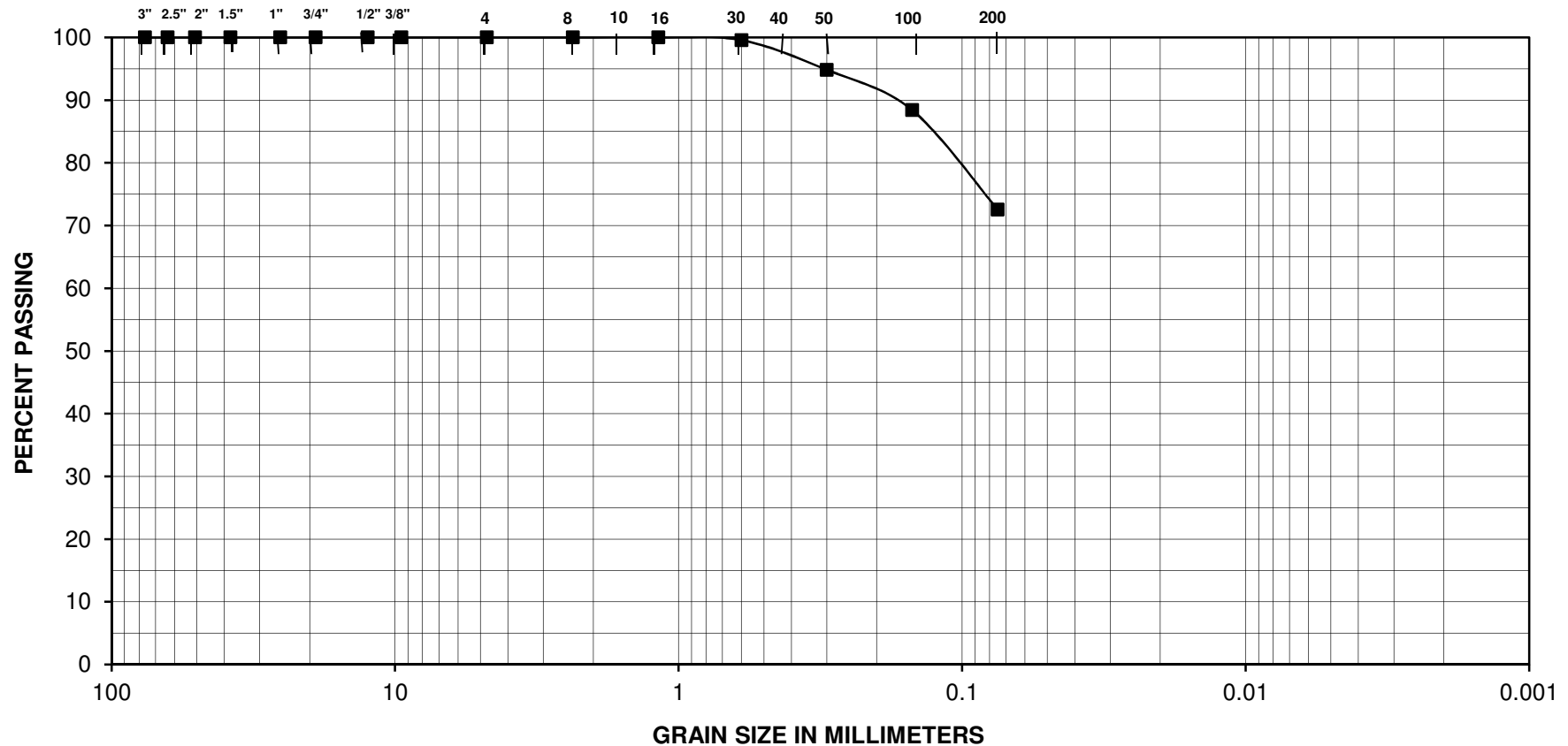
Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
	Date: <u>9/23/2013</u>
TES#: <u>23502-ZS9</u>	Sample No.: <u>MC12-2</u>
Boring #: <u>S0020R; 45.5-46'</u>	Classification: <u>(ML/CL) Silty Clay</u>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	208.8	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	208.8	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	68.9	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.0	0.0	0.0	100.0	
#30	0.9	0.9	0.4	99.6	
#50	10.8	9.9	5.2	94.8	
#100	24.2	13.4	11.6	88.4	
#200	57.3	33.1	27.4	72.6	
Pan	68.9				



### U.S. STANDARD SIEVE NUMBERS



GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

—■— MC12-2

[illegible]



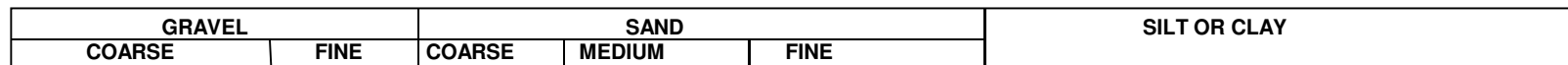
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: CA HSR	Technician: K. Ford
TES#: 23502-ZS9	Date: 9/23/2013
Boring #: S0020R; 56-56.5'	Sample No.: MC14-1
	Classification: (ML/CL) Silty Clay

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	171.6	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	171.6	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	73.2	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	0.4	0.3	0.2	99.8	
#50	2.4	2.0	1.4	98.6	
#100	7.6	5.2	4.4	95.6	
#200	39.1	31.5	22.8	77.2	
Pan	73.2				



[illegible]



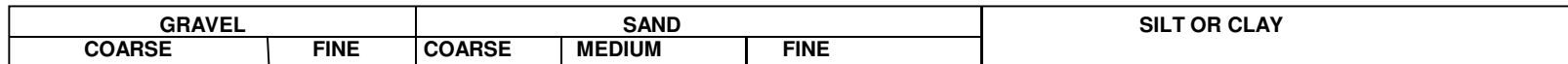
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: CA HSR	Technician: K. Ford
	Date: 9/23/2013
TES#: 23502-ZS9	Sample No.: MC16-1
Boring #: S0020R; 66-66.5'	Classification: (SP) Fine Sand

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	187.1	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	187.1	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	182.4	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	27.5	27.4	14.7	85.3	
#50	145.3	117.8	77.7	22.3	
#100	177.1	31.8	94.7	5.3	
#200	181.7	4.6	97.1	2.9	
Pan	182.4				





—■— MC16-1

[illegible]



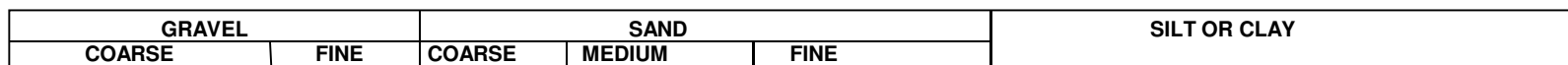
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
TES#: <u>23502-ZS9</u>	Date: <u>9/23/2013</u>
Boring #: <u>S0020R; 71-71.5'</u>	Sample No.: <u>SS17</u>
	Classification: <u>(SP/SM) Silty Sand</u>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	281.7	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	281.7	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	250	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.4	0.4	0.1	99.9	
#30	40.6	40.2	14.4	85.6	
#50	174.3	133.7	61.9	38.1	
#100	230.0	55.7	81.6	18.4	
#200	247.2	17.2	87.8	12.2	
Pan	250				



[illegible]



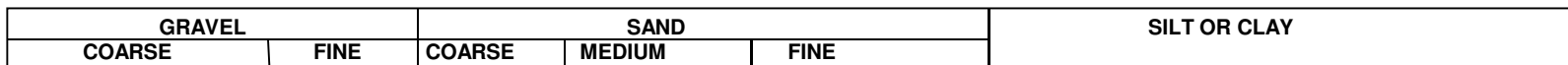
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
	Date: <u>9/23/2013</u>
TES#: <u>23502-ZS9</u>	Sample No.: <u>MC18-2</u>
Boring #: <u>S0020R; 75.5-76'</u>	Classification: <u>(ML/CL) Silty Clay</u>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	160.4	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	160.4	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	35.1	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#16	0.1	0.1	0.1	99.9	
#30	0.3	0.2	0.2	99.8	
#50	1.9	1.6	1.2	98.8	
#100	3.4	1.5	2.1	97.9	
#200	18.4	15.0	11.5	88.5	
Pan	35.1				



[illegible]





*Construction Testing & Inspection \* Geotechnical & Environmental Engineering*

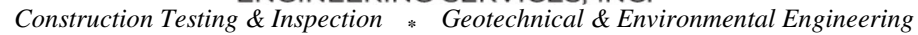
## Sieve Analysis for Soil and Fine Aggregate

Project: <b>HSR</b>	Technician: <b>K. Ford</b>
	Date: <b>9/12/2013</b>
TES#: <b>23502-ZS9</b>	Sample No.: <b>SS19</b>
Boring No.: <b>S0020R</b>	Remarks: <b>(ML) Sandy Silt</b>

	Weight (grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	63.75	1/2"	4.0 (2.0)
Initial Weight Fine		3/4"	11.0 (5.0)
Soil Before Wash	63.75	1"	22.0 (10.0)
Final Weight Fine		1 1/2"	33.0 (15.0)
Soil After Wash	<b>28.7</b>	2"	44.0 (20.0)

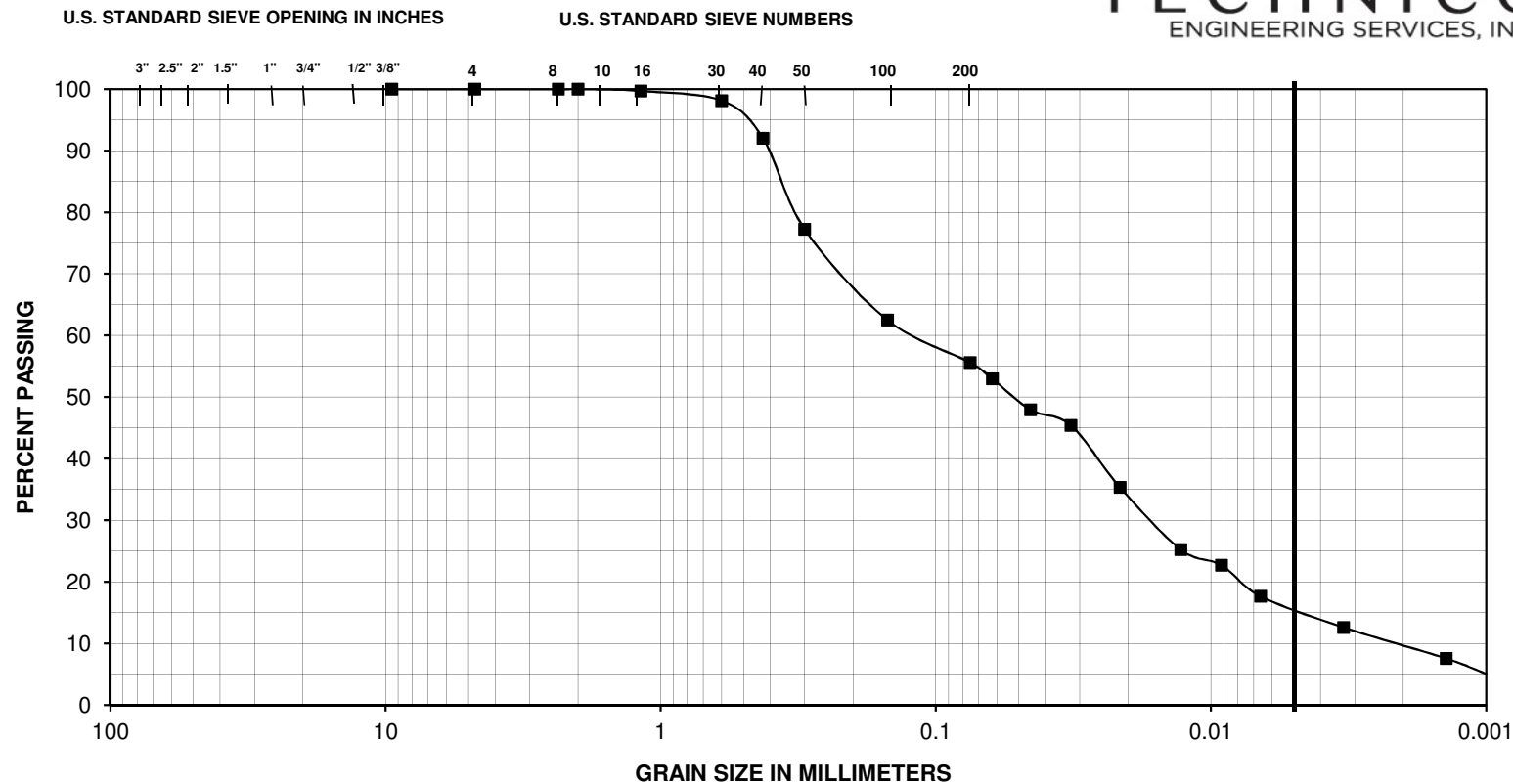
Sieve Size	Individual Weight Retained	Individual % Retained	Combined % Retained	Combined % Passing	Specs.
3 in.	0.0	0.0	0.0	100.0	
2 1/2 in.	0.0	0.0	0.0	100.0	
2 in.	0.0	0.0	0.0	100.0	
1 1/2 in.	0.0	0.0	0.0	100.0	
1 in.	0.0	0.0	0.0	100.0	
3/4 in.	0.0	0.0	0.0	100.0	
1/2 in.	0.0	0.0	0.0	100.0	
3/8 in.	0.0	0.0	0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.0	0.0	0.0	100.0	
#10	0.0	0.0	0.0	100.0	
#16	0.2	0.3	0.3	99.7	
#30	1.0	1.6	1.9	98.1	
#40	3.9	6.1	8.0	92.0	
#50	9.4	14.7	22.7	77.3	
#100	9.4	14.7	37.5	62.5	
#200	4.4	6.9	44.4	55.6	
Pan					





PROJECT: _____			HSR			TES # : 23502-ZS9	
Boring Number _____			SS19			TESTED BY: K. Ford	
Sample Depth, ft _____			36-36.5'			DATE: 9/12/2013	
Mass of Test Sample, g			64.07	"air-dried"	Hydrometer Type 151H		
Mass of Hygroscopic Sample, g			21.69	"air-dried"			
Mass of Hygroscopic Sample, g			21.58	"oven-dried"	Specific Gravity of Test Material		2.650
Mass of Test Sample, g			63.75	"oven-dried"	Specific Gravity of Test Solution		Varies
Time (min.)	Hydrometer Reading	Corrected Reading	Temperature Degrees C	Effective Depth Table 2 (cm)	Constant, K Table 3	Diameter, D (mm)	Amt. Suspended, P (%)
0.5	1.023	1.021	21	10.7	0.01348	0.0624	53.0
1	1.021	1.019	21	11.3	0.01348	0.0453	47.9
2	1.020	1.018	21	11.5	0.01348	0.0323	45.4
5	1.016	1.014	21	12.6	0.01348	0.0214	35.3
15	1.012	1.010	21	13.7	0.01348	0.0129	25.2
30	1.011	1.009	21	13.9	0.01348	0.0092	22.7
60	1.009	1.007	21	14.4	0.01348	0.0066	17.7
250	1.007	1.005	21	15.0	0.01348	0.0033	12.6
1440	1.005	1.003	21	15.5	0.01348	0.0014	7.6
2880	1.004	1.002	21	15.8	0.01348	0.0010	5.0





Sample #	Classification	% Gravel	% Sand	% Silt	% Clay*	% Moist.	LL	PL	PI	Project:	HSR
SS19	(ML) Sandy Silt	0	44.4	39.9	15.7	0.5					
										TES#:	23502-ZS9
										Boring#:	S0020R
										Date:	9/12/2013

\* Particles smaller than 5 Micron in diameter



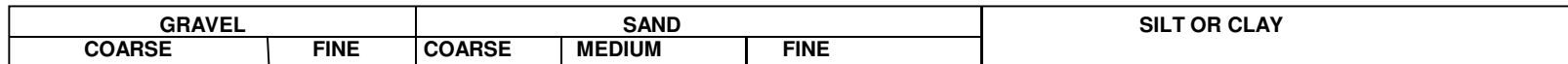
## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
TES#: <u>23502-ZS9</u>	Date: <u>9/23/2013</u>
Boring #: <u>S0020R; 95.5-96'</u>	Sample No.: <u>MC22-2</u>
	Classification: <u>(ML/CL) Clayey Silt</u>

	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	117.5	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	117.5	3/4"	11.0 (5.0)
		1"	22.0 (10.0)
Final Weight Fine Aggregate After Wash	22	1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.1	99.9	
#16	0.3	0.2	0.3	99.7	
#30	0.5	0.2	0.4	99.6	
#50	0.8	0.3	0.7	99.3	
#100	1.5	0.7	1.3	98.7	
#200	4.4	2.9	3.7	96.3	
Pan	22				



[illegible]



## Sieve Analysis for Soil / Fine Aggregate ASTM C-136

Project: <u>CA HSR</u>	Technician: <u>K. Ford</u>
TES#: <u>23502-ZS9</u>	Date: <u>9/23/2013</u>
Boring #: <u>S0020R; 101-101.5'</u>	Sample No.: <u>SS23</u>
	Classification: <u>(ML/CL) Silty Clay</u>

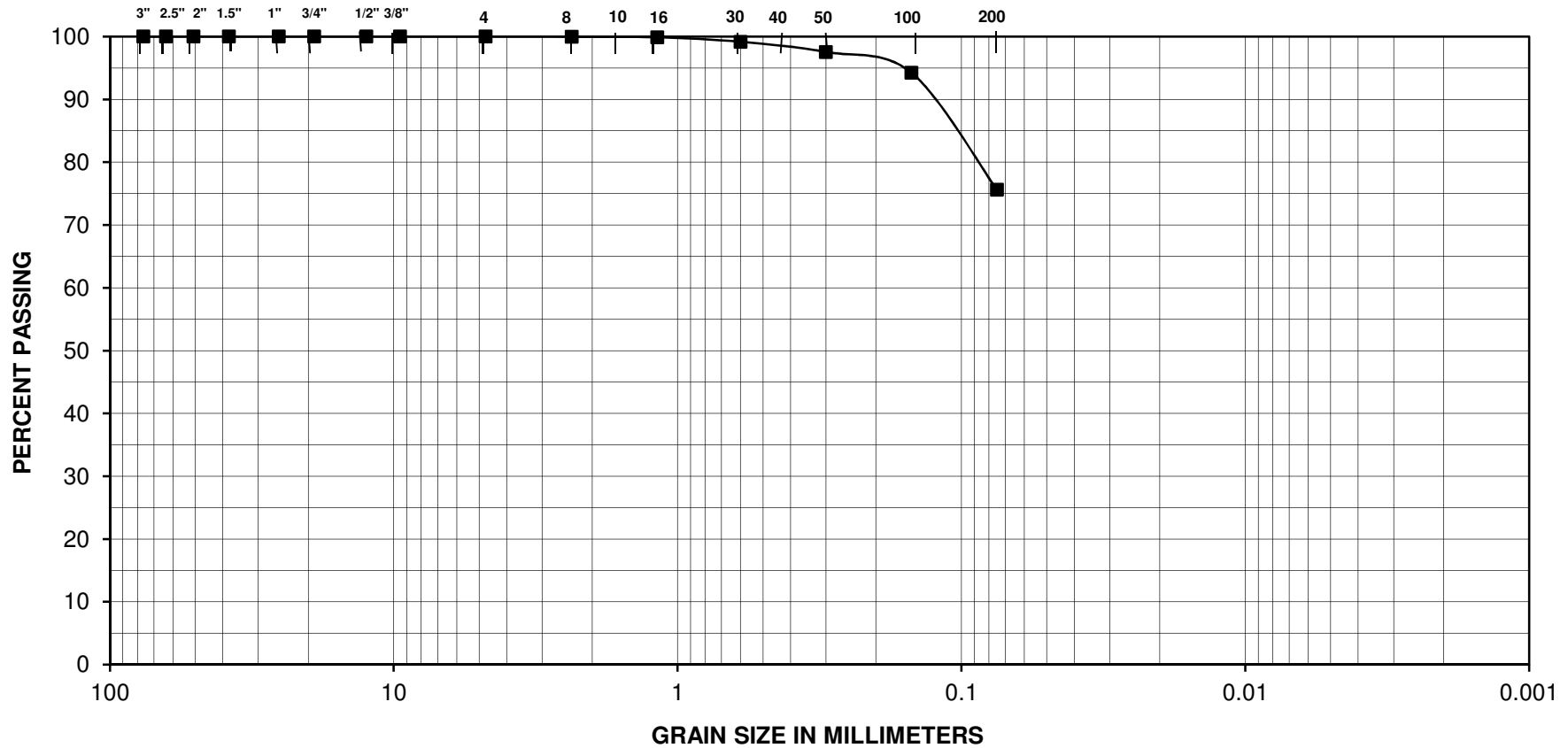
	Weight (lbs. or grams)	Maximum Sieve Size	Minimum Weight of Test Specimen, lbs. (kg)
Total Dry Sample + Tare Wt.		Sand	1.0 (0.5)
Tare Weight		3/8"	2.0 (1.0)
Total Dry Sample Wt.	264.8	1/2"	4.0 (2.0)
Initial Weight Fine Aggregate Before Wash	264.8	3/4"	11.0 (5.0)
Final Weight Fine Aggregate After Wash	93.2	1"	22.0 (10.0)
		1 1/2"	33.0 (15.0)
		2"	44.0 (20.0)

Sieve Size	Cumulative Weight Retained	Individual Weights Retained	Cumulative % Retained	Cumulative % Passing	Specs.
3 in.			0.0	100.0	
2 1/2 in.			0.0	100.0	
2 in.			0.0	100.0	
1 1/2 in.			0.0	100.0	
1 in.			0.0	100.0	
3/4 in.			0.0	100.0	
1/2 in.			0.0	100.0	
3/8 in.			0.0	100.0	
#4	0.0	0.0	0.0	100.0	
#8	0.1	0.1	0.0	100.0	
#16	0.3	0.2	0.1	99.9	
#30	2.2	1.9	0.8	99.2	
#50	6.5	4.3	2.5	97.5	
#100	15.2	8.7	5.7	94.3	
#200	64.6	49.4	24.4	75.6	
Pan	93.2				



**U.S. STANDARD SIEVE OPENING IN INCHES**

### U.S. STANDARD SIEVE NUMBERS



GRAVEL		SAND			SILT OR CLAY
COARSE	FINE	COARSE	MEDIUM	FINE	

—■— SS23

[illegible]





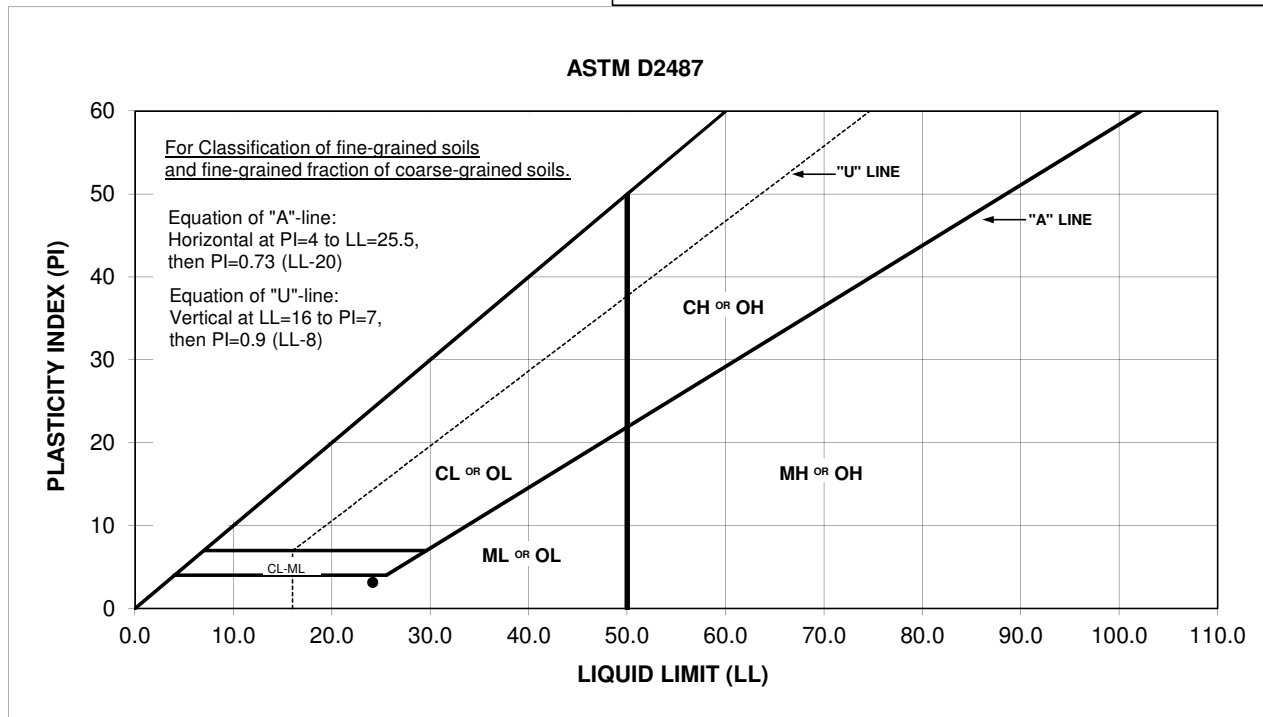
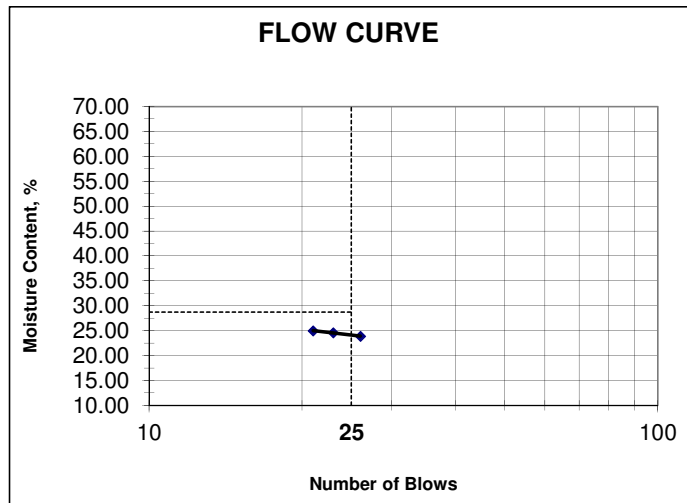
**Determination of Atterberg Limits**  
ASTM D 4318, CTM 204

Project Name:	HSR	Project No.:	23502-ZS9
Soil Boring No:	S0020R	Depth:	36-36.5'
Date:	9/19/13	Tested By:	K. Ford
Sample No.:	SS09	Classification:	(SM) Silty Sand

	PLASTIC LIMIT		
	1	2	3
A Tes No.			
B Tare No.			
C Mass of Pan + Dry Soil, g	25.20	34.20	33.00
D Mass of Pan + Wet Soil, g	26.20	35.40	34.00
E Mass of Pan, g	20.60	28.20	28.30
F Mass of Water, g	1.00	1.20	1.00
G Mass of Dry Soil, g	4.60	6.00	4.70
H Moisture Content, %	21.74	20.00	21.28
I Average Moisture Content, % (PL)	21.01		

	LIQUID LIMIT		
	21	26	23
No. of Blows			
	34.70	25.30	34.40
	36.30	26.40	35.90
	28.30	20.70	28.30
	1.60	1.10	1.50
	6.40	4.60	6.10
	25.00	23.91	24.59

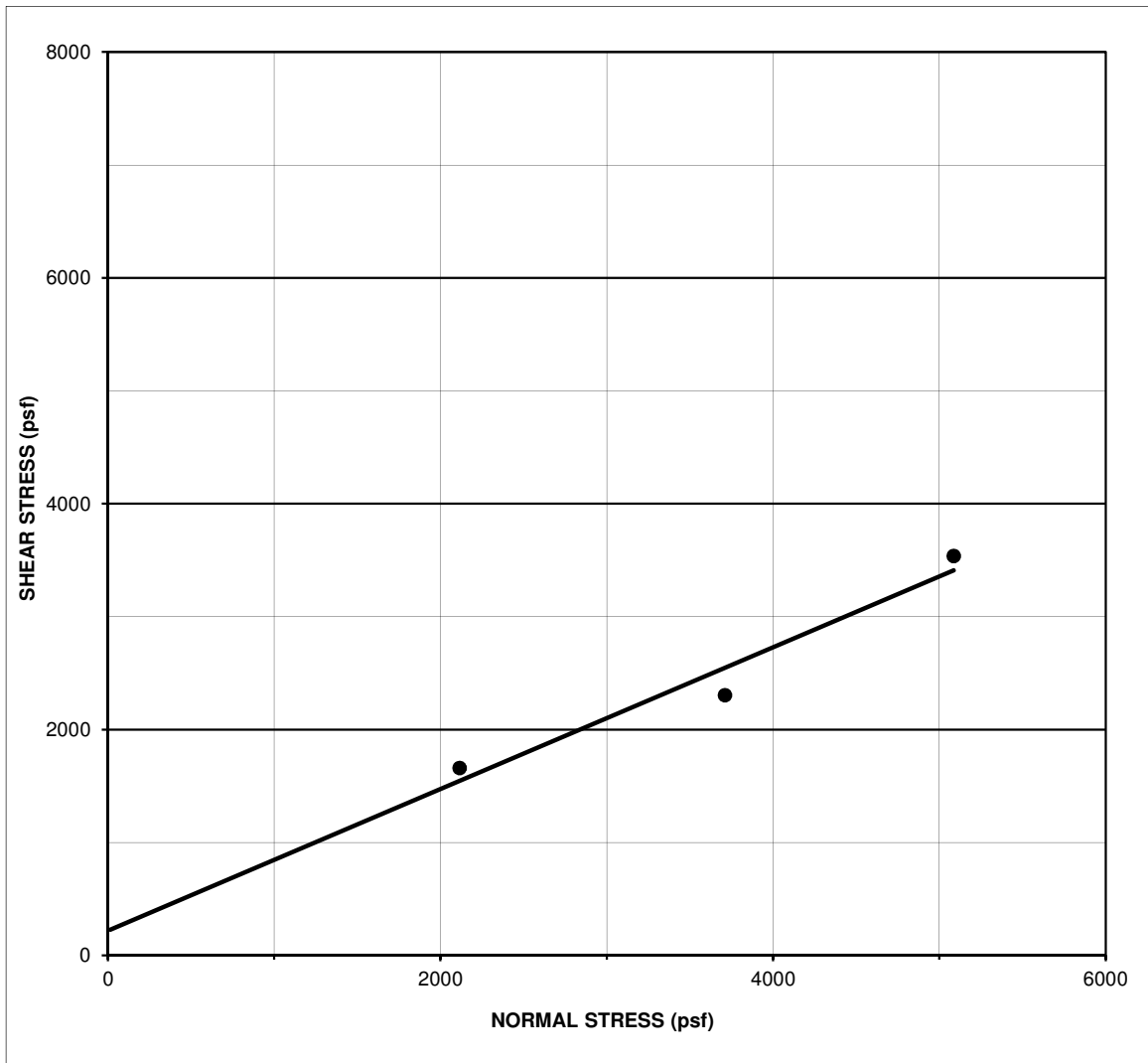
<b>Liquid Limit:</b>	<b>24.1</b>
<b>Plastic Limit:</b> Line I	<b>21.0</b>
<b>Plasticity Index:</b> PI = LL - PL	<b>3.1</b>







**Direct Shear Test**  
**ASTM D3080**



PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/7/2013
BORING NO.:	S0020R
SAMPLE NO.:	MC04-1 Depth(11'-11.5')
DESCRIPTION:	Fine Sand (SP)

Cohesive Pressure, psf	220
Internal Friction Angle	32

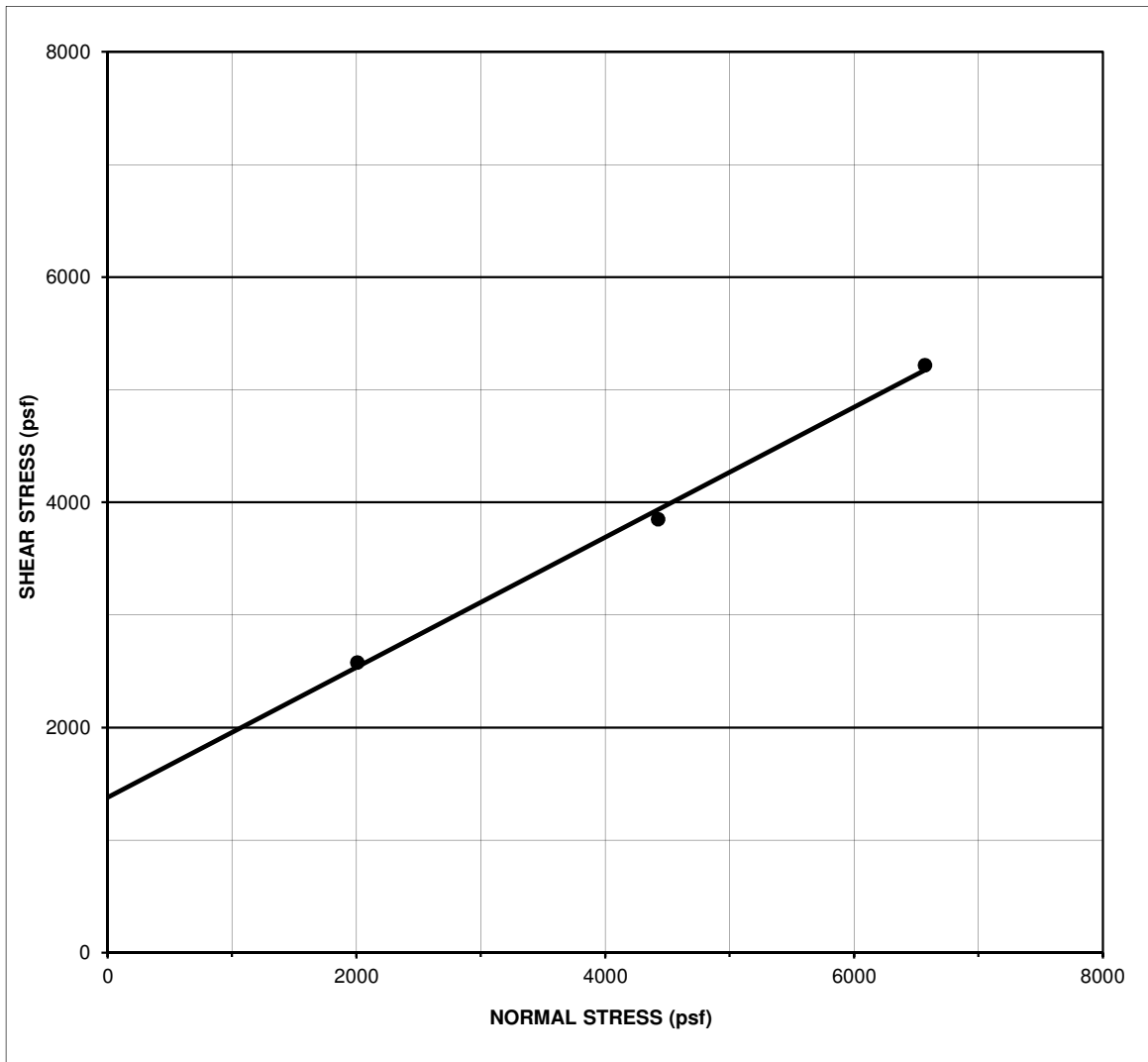
SPECIMEN	A	B	C	D	E
DRY DENSITY (pcf)	106.1	106.1	106.1	---	---
INITIAL WATER CONTENT (%)	6.3	6.3	6.3	---	---
FINAL WATER CONTENT (%)	21.00	22.00	23.00	---	---
NORMAL STRESS (psf)	2115	3711	5086	---	---
MAXIMUM SHEAR (psf)	1659	2304	3538	---	---

**Engineering Materials Laboratory**  
4539 N. Brawley #108, Fresno, CA 93722  
559-276-9311





**Direct Shear Test**  
**ASTM D3080**



PROJECT:	HSR
TES NO.:	23502-ZS9
SAMPLE DATE.:	9/7/2013
BORING NO.:	S0020R
SAMPLE NO.:	MC06-1 Depth(21'-21.5')
DESCRIPTION:	Silty Sand (SM)

Cohesive Pressure, psf	1380
Internal Friction Angle	30

SPECIMEN	A	B	C	D	E
DRY DENSITY (pcf)	90.2	90.2	90.2	---	---
INITIAL WATER CONTENT (%)	33.3	33.3	33.3	---	---
FINAL WATER CONTENT (%)	25.60	28.70	24.30	---	---
NORMAL STRESS (psf)	2009	4426	6572	---	---
MAXIMUM SHEAR (psf)	2577	3851	5219	---	---

**Engineering Materials Laboratory**  
4539 N. Brawley #108, Fresno, CA 93722  
559-276-9311